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PENDING CLAIMS:

The currently pending claims, as originally filed, are provided as follows:

1 1. (Currently Amended) A wireless communication system comprising:

2 a plurality of <u>spatially separate</u> transceiver antennae to transmit a corresponding

3 plurality of data streams comprising a communication channel to a remote receiver

4 having a plurality of receiver antennae, each transceiver spatially separate from at least

ene other transceiver antenna, each transceiver antenna further comprising a transceiver

6 antenna polarization, at least one transceiver antenna having a polarization that is

7 different than at least one other transceiver antenna, each transceiver antenna transmitting

8 a corresponding data stream;

9 a plurality of receiver antennae, the receiver antennae receiving at least one data

10 stream; wherein

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II the communication channel between the transceiver antennae and the receiver

antennae is characterized by a channel matrix, and wherein the transceiver antenna

13 polarization of each transceiver antenna is pre-set to optimize determined by reducing a

14 measure of a singular value spread of the channel matrix to improve a separability of the

15 received data streams.

1 2. (Currently Amended) The wireless communication system of claim 1, wherein

2 the pre-set transceiver antenna polarization of each transceiver antenna is determined

3 experimentally.

- 1 3. (Currently Amended) The wireless communication system of claim 2, wherein
- 2 the pre-set transceiver antenna polarization of each transceiver antenna is experimentally
- 3 determined by characterizing the separability of received data streams.
- 1 4. Please cancel claim 4, without prejudice.
- 5. (Original) The wireless communication system of claim 1, wherein each receiver
- 2 antenna is spatially separate from at least one other receiver antenna, each receiver
- 3 antenna further comprising a receiver antenna polarization, at least one receiver antenna
- 4 having a polarization that is different than at least one other receiver antenna.
- 1 6. (Currently Amended) The wireless communication system of claim 1, further
- 2 comprising a receiver that is connected to the receiver antenna, the receiver including
- 3 electronic circuitry for estimating a the channel matrix that represents a the transmission
- 4 channel between the transceiver antennae and the receiver antennae, the pre-set
- 5 transceiver antenna polarization of each transceiver antenna being determined by
- 6 minimizing a reducing the measure of the singular value spread of the channel matrix.
- 1 7. (Currently Amended) The wireless communication system of claim 5, wherein
- 2 the receiver antenna polarization of each receiver antenna is pre-set to optimize
- 3 separability of the received data streams.

- 1 8. (Currently Amended) The wireless communication system of claim 7, wherein
- 2 the pre-set receiver antenna polarization of each receiver antenna is determined
- 3 experimentally.
- 1 9. Please cancel claim 9, without prejudice.
- 1 10. (Original) The wireless communication system of claim 1, wherein the transceiver
- 2 antenna polarization of each transceiver antenna is pre-set to minimize correlation
- 3 between the data streams.
- 1 11. (Original) The wireless communication system of claim 10, wherein the pre-set
- 2 transceiver antenna polarization of each transceiver antenna is determined
- 3 experimentally.
- 1 12. (Original) The wireless communication system of claim 11, wherein a transmission
- 2 channel between the transceiver antennae and the receiver antennae is estimated with a
- 3 channel matrix, and wherein the pre-set transceiver antenna polarization of each
- 4 transceiver antenna is experimentally determined by minimizing a correlation coefficient
- 5 of the channel matrix.
- 1 13. (Original) The wireless communication system of claim 5, wherein the receiver
- 2 antenna polarization of each receiver antenna is pre-set to minimize correlation between
- 3 the data streams.

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- 1 14. (Original) The wireless communication system of claim 13, wherein the pre-set
- 2 receiver antenna polarization of each receiver antenna is determined experimentally.
- 1 15. (Original) The wireless communication system of claim 14, wherein a transmission
- 2 channel between the transceiver antennae and the receiver antennae is estimated with a
- 3 channel matrix, and wherein the pre-set receiver antenna polarization of each receiver
- 4 antenna is experimentally determined by minimizing a correlation coefficient of the
- 5 channel matrix.
- 1 16. (Original) The wireless communication system of claim 1, further comprising
- 2 clusters of transceiver antennae, each cluster including a transmission channel, wherein
- 3 the pre-set transceiver antenna polarization of each transceiver antenna is experimentally
- 4 determined by minimizing co-channel interference between the clusters.
- 1 17. (Currently Amended) A wireless communication system comprising:
- a plurality of spatially separate transceiver antennae to transmit a corresponding
- 3 plurality of data streams comprising a communication channel to a remote receiver
- 4 having a plurality of receiver antennae, each transceiver spatially separate from at least
- 5 one other transceiver antenna; each transceiver antenna further comprising a transceiver
- 6 antenna polarization, at least one transceiver antenna having a polarization that is
- 7 different than at least one other transceiver antenna, each transceiver antenna transmitting
- 8 a corresponding data stream;

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a plurality of receiver antennae, the receiver antennae receiving at least one data 9 stream; wherein 10 the communication channel between the transceiver antennae and the receiver 11

- antennae is characterized by a channel matrix, and wherein the transceiver antenna 12 polarization of each transceiver antenna is adaptively set to eptimize reduce a measure of 13 singular value spread of the channel matrix separability of the received data streams base
- on channel parameters determined within a receiver connected to the receiver antennae. 15
 - The wireless communication system of claim 17, wherein 18. (Currently Amended) 1
- the receiver includes electronic circuitry for estimating a the channel matrix that represent 2
- a transmission channel between the transceiver antennae and the receiver antennae, the 3
- transceiver antenna polarization of each transceiver antenna being adaptively set by 4
- minimizing a the singular value spread of the channel matrix. 5
- 19. (Original) A method of wirelessly communicating between a transceiver and a 1
- receiver within a wireless communication system, the communication system comprising 2
- 3 the transceiver, the transceiver comprising a plurality of transceiver antennae, each
- transceiver spatially separate from at least one other transceiver antenna, each transceiver 4
- 5 antenna further comprising a transceiver antenna polarization, at least one transceiver
- 6 antenna having a polarization that is different than at least one other transceiver antenna,
- the communication system further comprising the receiver, the receiver comprising a 7
- plurality of receiver antennae, the method comprising: 8
- each transceiver antenna transmitting a corresponding data stream; 9

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- 10 the receiver antennae receiving at least one data stream;
- electronic circuitry within the receiver estimating a channel matrix that represents
- 12 a transmission channel between the transceiver antennae and the receiver antennae; and
- pre-setting the transceiver antenna polarization of each transceiver antenna by
- 14 minimizing a singular value spread of the channel matrix.
 - 1 20. (Original) The method of wirelessly communicating between a transceiver and a
 - 2 receiver within a wireless communication system of claim 19, wherein each receiver
 - antenna is spatially separate from at least one other receiver antenna, each receiver
 - 4 antenna further comprising a receiver antenna polarization, at least one receiver antenna
 - 5 having a polarization that is different than at least one other receiver antenna, the method
 - 6 further comprising:
 - 7 pre-setting the receiver antenna polarization of each receiver antenna by
 - 8 minimizing a singular value spread of the channel matrix.
 - 21. (Original) The method of wirelessly communicating between a transceiver and a
 - 2 receiver within a wireless communication system of claim 19, the method comprising:
 - 3 pre-setting the transceiver antenna polarization of each transceiver antenna to
 - 4 minimize correlation between the data streams.
 - 1 22. (Original) The method of wirelessly communicating between a transceiver and a
 - 2 receiver within a wireless communication system of claim 20, the method comprising:

- pre-setting the receiver antenna polarization of each receiver antenna to minimize correlation between the data streams.
- 1 23. (CurrentlyAmended) A wireless communication system comprising:
- 2 a plurality of transceiver antennae, each transceiver spatially separate from at least
- 3 one other transceiver antenna, each transeciver antenna further comprising a transceiver
- 4 antenna polarization, at least one-transceiver antenna having a polarization that is
- 5 different than at least one other transceiver antenna, each transceiver antenna transmitting
- 6 a corresponding data stream;
- 7 a plurality of a receiver, including one or more receiver antennae, the receiver
- 8 antennae receiving at least one data stream from a remote transmitter having a plurality of
- 9 transceiver antennae, at least one transceiver antenna having a polarization that is
- 10 different from at least one other transceiver antenna, each transceiver antenna
- 11 corresponding an associated data stream; and
- means for setting the transceiver antenna polarization of each transceiver antenna
- 13 to reduce a measure of singular value spread of a channel matrix representation of a
- 14 transmission channel including at least a subset of the data streams between the
- 15 transceiver antennae and the one or more receiver antennae optimize separability of the
- 16 received data streams.
- 1 24. Please cancel claim 24 without prejudice.

- 1 25. (Original) The wireless communication system of claim 23, wherein each receiver
- 2 antenna is spatially separate from at least one other receiver antenna, each receiver
- 3 antenna further comprising a receiver antenna polarization, at least one receiver antenna
- 4 having a polarization that is different than at least one other receiver antenna.
- 1 26. (Currently Amended) The wireless communication system of claim 23, further
- 2 comprising a receiver that is connected to the receiver antennae, the receiver including
- 3 electronic circuitry for estimating a to estimate the channel matrix that represents a the
- 4 transmission channel between the transceiver antennae and the receiver antennae,
- 5 wherein the means for setting the transceiver antenna polarization of each transceiver
- 6 antenna is responsive to the electronic circuitry minimizing a singular value spread of the
- 7 channel-matrix.
- 1 27. (Original) The wireless communication system of claim 25, further comprising
- 2 means for setting the receiver antenna polarization of each receiver antenna to optimize
- 3 separability of the received data streams.
- 28. (Original) The wireless communication system of claim 27, wherein a transmission
- 2 channel between the transceiver antennae and the receiver antennae is estimated with a
- 3 channel matrix, and wherein the means for setting the receiver antenna polarization of
- 4 each receiver antenna comprises minimizing a singular value spread of the channel
- 5 matrix.

- 1 29. (Original) The wireless communication system of claim 25, further comprising
- 2 means for setting the receiver antenna polarization of each receiver antenna to optimize
- 3 de-correlation of the received data streams.
- 1 30. (Original) The wireless communication system of claim 29, wherein a transmission
- 2 channel between the transceiver antennae and the receiver antennae is estimated with a
- 3 channel matrix, and wherein the means for setting the receiver antenna polarization of
- 4 each receiver antenna comprises minimizing a correlation coefficient of the channel
- 5 matrix.
- 1 31. Please cancel claim 31 without prejudice.
- 1 32. (New) A wireless communication system of claim 23, wherein the means for setting the
- 2 transceiver antennae polarization resides within the receiver.
- 1 33. (New) A method comprising:
- 2 receiving a plurality of signals from a remote transmitter, the remote transmitter
- 3 transmitting the plurality of signals from two or more transceiver antennae, wherein at least one
- 4 transceiver antenna has a different polarization than another transceiver antenna;
- developing a channel matrix representation of a transmission channel that includes at
- 6 least a subset of the plurality of received signals; and

- 7 determining an improved polarization for at least a subset of the transceiver antennae to
- 8 reduce a singular value spread in the developed channel matrix.